

Statistical bulletin

Business enterprise research and development, UK: 2016

Spending and numbers employed on research and development in the UK broken down by product sector, and civil and defence businesses.



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1 . Main points

- Expenditure on research and development (R&D) performed by UK businesses continued to grow, expanding by £1.2 billion to £22.2 billion in 2016, an increase of 5.6%.
- Motor vehicles and parts was the product group that had the largest growth in expenditure on R&D performed by UK businesses, of £562 million (20%).
- London had the largest growth in regional business R&D expenditure, increasing by £404 million (21.4%) to £2.3 billion in 2016.
- UK business R&D consisted of civil R&D of £20.7 billion (93%) and defence R&D of £1.6 billion (7%); civil and defence R&D expenditure grew by 5.7% and 5.1% respectively in 2016.
- In 2016, total business employment in R&D in the UK grew by 1.9% to 210,000 full-time equivalents (FTE).

2 . Statistician's comment

"Spending by UK businesses on research and development (R&D) was over £22 billion last year. This continues the growth of more than £1 billion a year since 2013. 2016 also saw employment in R&D reach its highest-ever level, accounting for over 200,000 full-time-equivalents."

Daniel Groves, National Accounts and Economic Statistics, Office for National Statistics.

3 . Things you need to know about this release

Business enterprise research and development (BERD) covers estimates of UK businesses expenditure and employment relating to research and development (R&D) performed in the UK in 2016.

In this statistical bulletin, R&D and related concepts follow internationally agreed standards defined by the [Organisation for Economic Co-operation and Development \(OECD\)](#), as published in the [Frascati Manual \(2015\)](#).

When comparing total business R&D intensity across countries, it is important to take into account differences in industrial structure. The Organisation for Economic Co-operation and Development (OECD) produces a [Science, Technology and Industry Scoreboard](#) to facilitate these comparisons. International comparisons of R&D data can also be found on the [Eurostat](#) website.

This release reports on R&D expenditure in UK businesses irrespective of the country of residence of the ultimate owner or users of the R&D produced.

R&D is measured by the expenditure on R&D performed by a business, or the funding received by a business for R&D work. These are often but not always the same. Performance is regarded as a more accurate measure than funding received by a business, as not all funds received may be used as intended.

Further information on business R&D estimates is available in the [UK Business Enterprise Research and Development Quality and Methodology Information \(QMI\)](#) report.

All figures quoted are in current prices unless otherwise stated.

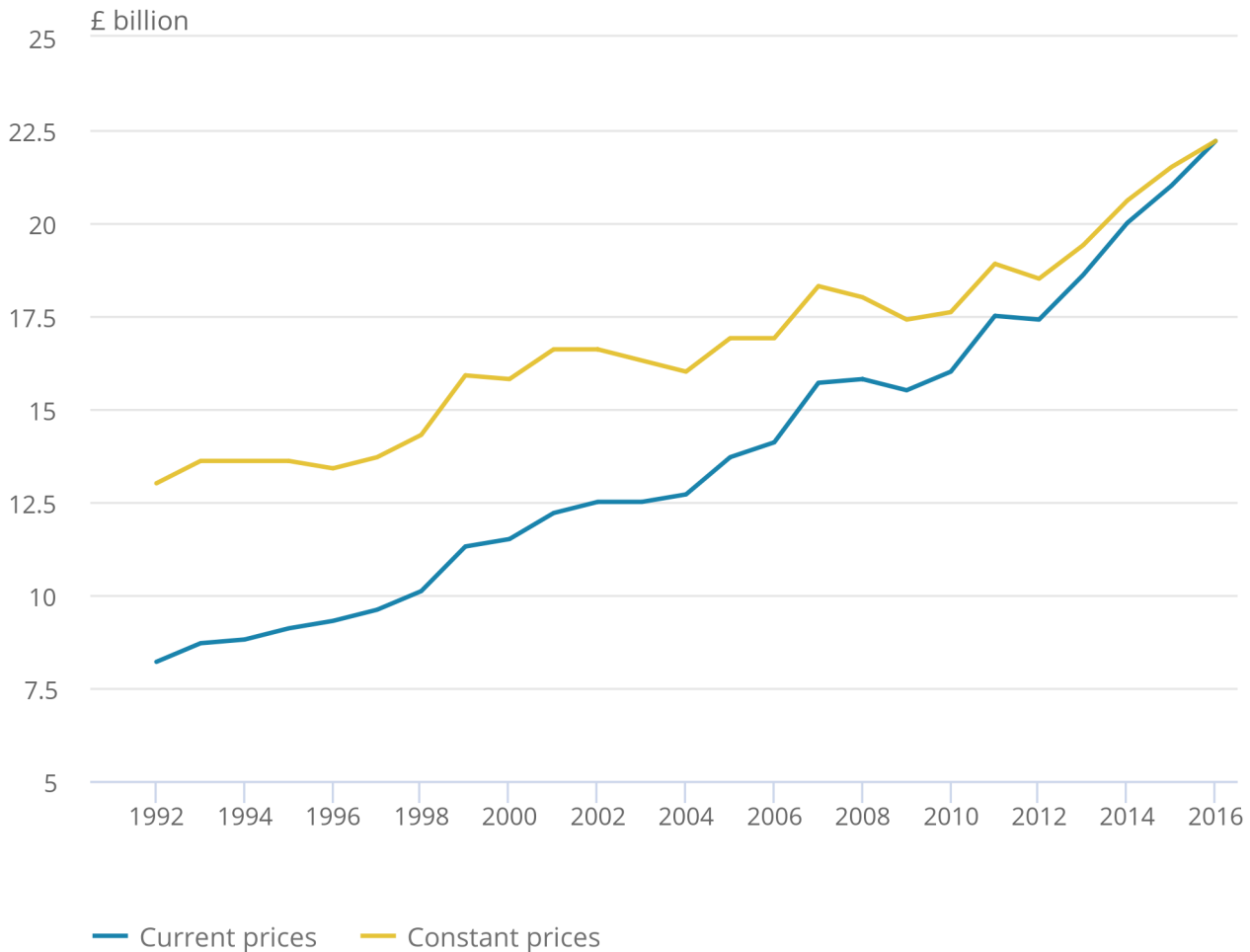
4 . Long-term upward trend for R&D expenditure continues

Expenditure on research and development (R&D) performed by UK businesses was £22.2 billion in 2016. This was up from £21.0 billion in 2015, an increase of 5.6%. The average annual growth rate since 1992 was 4.3%.

A long-term upward trend is evident when considering R&D expenditure in constant price terms, with an average annual growth rate of 2.3% since 1992 levels (£13.0 billion) (Figure 1).

Figure 1: Expenditure by UK businesses on performing research and development, 1992 to 2016

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Source: Office for National Statistics

Source: Office for National Statistics

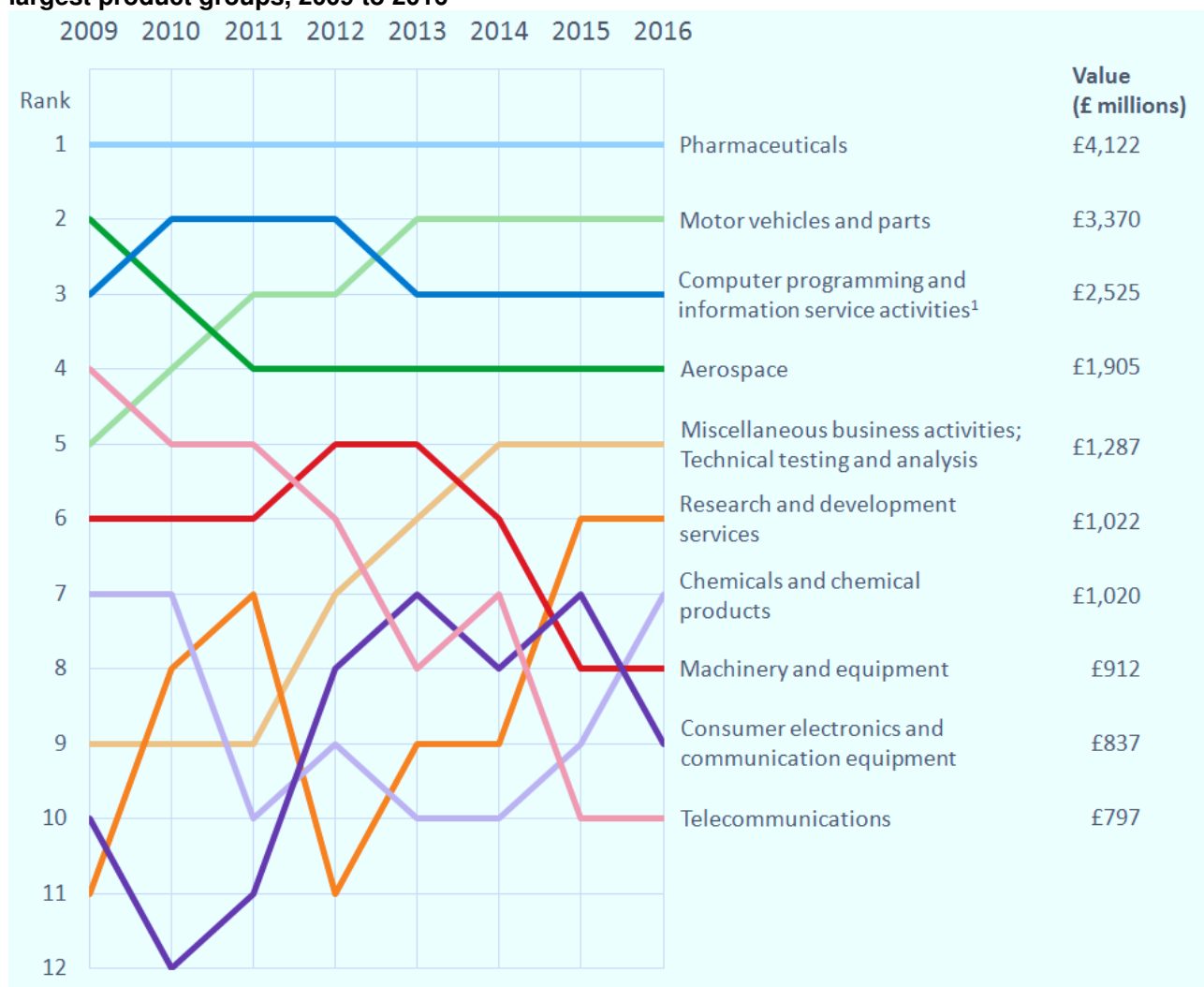
The total business R&D expenditure in 2016 represented 1.1% of gross domestic product (GDP). This estimate has remained unchanged since 2014.

5 . What is the breakdown of R&D expenditure by product group?

On an annual basis, the 400 largest research and development (R&D) performers are asked to select the product groups that best describe the type of R&D activities that they undertake. For the 2016 survey, the largest 400 performers were those businesses previously reporting more than approximately £5.7 million expenditure on performing R&D. These businesses accounted for approximately 78% of 2016 business R&D. The concept of "product groups" is described in more detail in the [UK Business Enterprise Research and Development Quality and Methodology Information \(QMI\)](#) report.

In 2016, pharmaceuticals continued to be the largest product group, with £4.1 billion expenditure. This product group accounted for 19% of total expenditure on R&D performed in UK businesses, falling by 1% in 2016 (Figure 2).

Figure 2: Expenditure by UK businesses on performing research and development in current prices, by largest product groups, 2009 to 2016



The largest increase in an individual product group was in the motor vehicles and parts group, which grew for the seventh year in succession, to £3.4 billion in 2016. This was an increase of £562 million (20%) from £2.8 billion in 2015 and accounted for 15% of expenditure on R&D performed in UK businesses in 2016.

More evidence of the growth in the motor industry can be viewed in our [UK Manufacturers' Sales by Product \(prodcom\) statistical bulletins](#).

Another notable increase was in the aerospace group, which increased by £206 million (12.1%) from £1.7 billion in 2015. In 2016, this group accounted for 9% of expenditure on R&D performed in UK businesses.

Other product groups reporting £1.0 billion or more R&D expenditure in the UK in 2016 were:

- computer programming and information services activities (excluding software development), £1.8 billion (8% of total R&D expenditure)
- miscellaneous business activities; technical testing and analysis, £1.3 billion (6%)
- research and development, £1.0 billion (5%)
- chemicals and chemical products, £1.0 billion (5%)

These seven product groups accounted for 65% of the total UK business R&D expenditure in 2016.

In 2015, the computer programming and information services activities group was the third largest, accounting for 11% of total UK R&D expenditure. For 2016, R&D into software development has been separated from this group to be monitored individually. Comparing with 2015, the two groups in 2016 accounted for £2.5 billion (11% of total UK R&D expenditure).

Since 2015, 16 product groups experienced an increase in levels of R&D expenditure by UK businesses and 16 groups experienced a decrease. The two remaining groups were the result of the split of the former computer programming and information services activities group, to monitor software development separately. Together these two new groups show an increase.

In terms of percentage growth, the largest product group increases were in wholesale and retail trade (43%), rubber and plastic products (37%) and construction (35%). In contrast, the product group that had the largest decrease was casting of iron and steel, which fell by 25% since 2015.

6 . Both civil and defence R&D expenditure continue to rise

Analyses of research and development (R&D) expenditure statistics can be split between the civil and defence sectors. Expenditure on R&D performed by UK businesses in the civil sector in 2016 (£20.7 billion) accounted for 93% of the total, with the remainder accounted for by defence (£1.6 billion). The value of R&D expenditure within the civil and defence sectors in 2016 reflected increases of 5.7% and 5.1% respectively on 2015.

Further splits of civil and defence R&D, such as detailed product groups, sources of funds, capital expenditure and employment, can be found in the [2016 datasets](#).

7 . Scientific R&D leads the way for industry expenditure

Research and development (R&D) expenditure estimates by industry, based on the Standard Industrial Classification 2007 (SIC 2007), were introduced in the 2011 Business enterprise research and development (BERD) statistical bulletin. These broaden the scope of the estimates (see Table 26 in the [2016 datasets](#)).

It is important to note that estimates of R&D expenditure by industry and product group are not directly comparable. This is because businesses may report significant R&D in product groups that are different to the main classification of their business according to the SIC 2007. The concepts of product groups and SIC 2007 are described in more detail in the UK Business Enterprise Research and Development Quality and Methodology Information (QMI) report.

The highest level of business R&D expenditure in 2016 by SIC 2007 was performed by businesses that were classified to the scientific research and development industry, at £5.3 billion, which represented 24% of total expenditure (Figure 3).

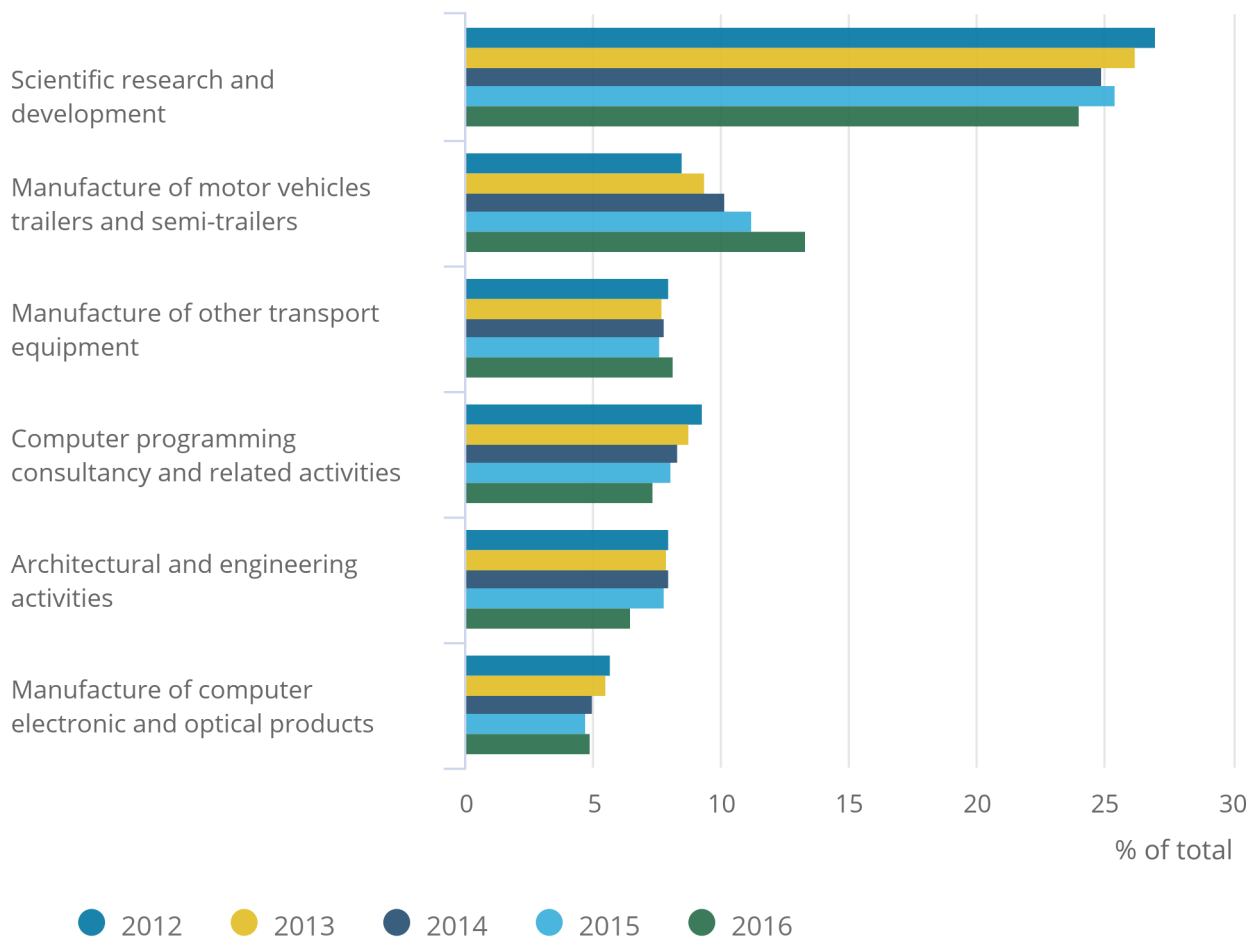
There are five other industries that had R&D expenditure of £1.0 billion or more:

- manufacture of motor vehicles and trailers, £2.9 billion (13%)
- manufacture of other transport equipment, £1.8 billion (8%)
- computer programming, consultancy and related activities, £1.6 billion (7%)
- architectural and engineering activities, £1.5 billion (7%)
- manufacture of computer, electronic and optical products, £1.1 billion (6%)

These [six](#) industries accounted for 64% of the total UK business R&D expenditure in 2016.

Figure 3: Percentage share of total expenditure by UK businesses on performing research and development, by largest industries, 2012 to 2016

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Source: Office for National Statistics

Source: Office for National Statistics

8 . Employment in R&D reaches highest level yet in 2016

Estimates of employment in research and development (R&D) are produced on a full-time equivalent (FTE) basis, whereby businesses convert part-time employees' hours into full-time employees' equivalent. FTE estimates provide a better indication of total labour input than headcount.

The lowest level of employment in R&D in the last decade occurred in 2006, when 147,000 FTEs were employed. Since then, there has been steady growth, reaching the highest level to date in 2016 at 210,000 (Figure 4).

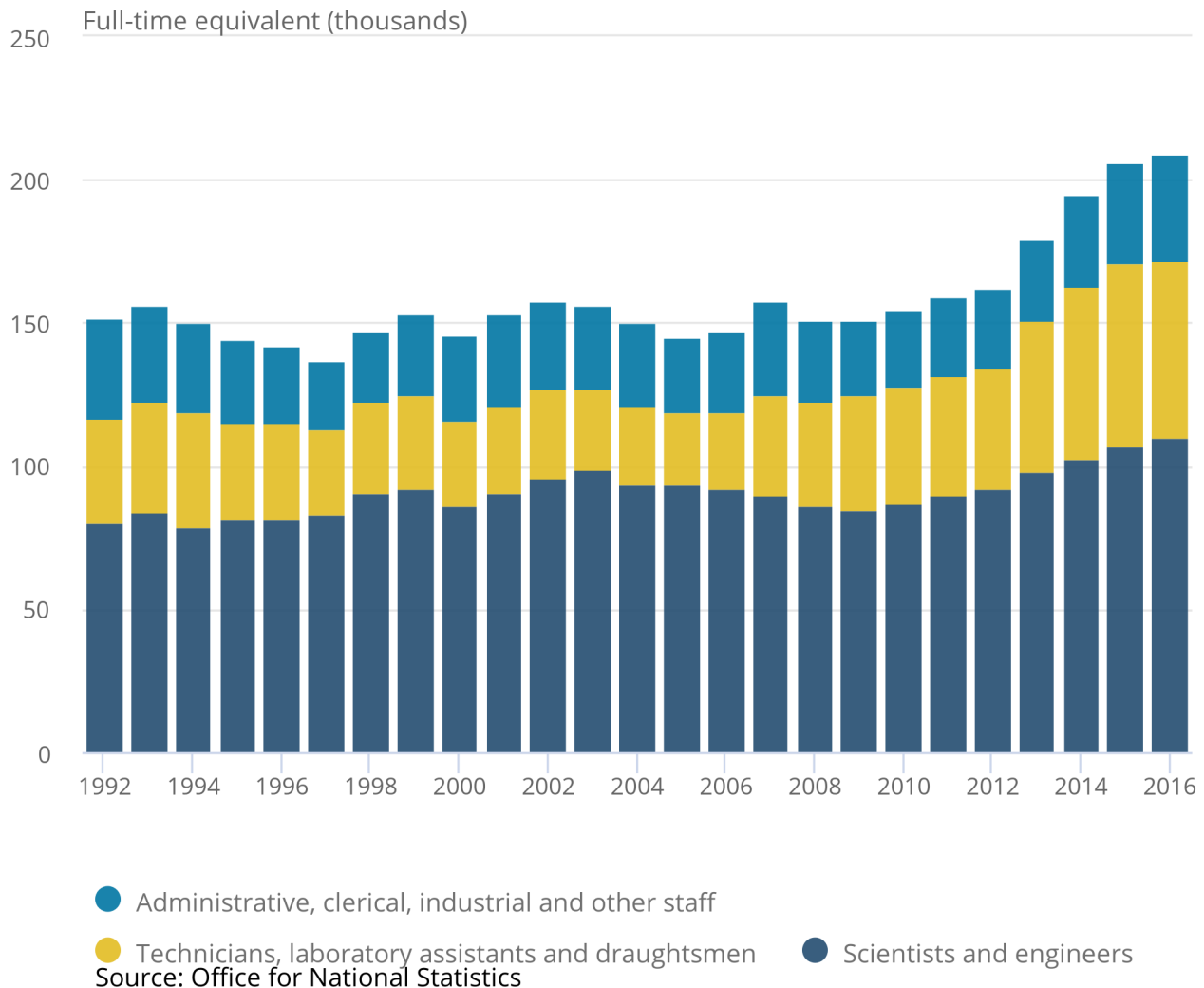
The number of FTEs employed in R&D rose from 206,000 in 2015 to 210,000 in 2016, an increase of 2%. While there has been growth in recent years in the number of people working on R&D, this should be seen in the context of a rise in the total employment in the UK labour market. Therefore, part of the growth in employment on R&D may reflect the wider growth in total employment in the economy. See our [labour market statistics](#) for more information on total employment levels.

The 2016 estimate comprised:

- 110,000 scientists and engineers (52%)
- 62,000 technicians (30%)
- 37,000 administrative staff (18%)

Figure 4: Employment in UK businesses on performing research and development, 1992 to 2016

Figure 4: Employment in UK businesses on performing research and development, 1992 to 2016



Source: Office for National Statistics

9 . South East and East of England spent the most on performing R&D

Analysis of research and development (R&D) expenditure by country and region is also possible. In this context, “region” refers to the location where a business performs R&D, not the location of either the business’ headquarters or that of any external funders.

The South East and East of England continue to dominate where R&D expenditure takes place in the UK. These two regions combined accounted for 41% of UK business R&D expenditure in 2016. These regions combined also employed 79,000 full-time equivalent (FTE) staff, which made up 38% of total R&D employment in 2016.

The regions or countries with the lowest levels of employment on performing R&D were the North East employing 4,000 FTE, with Wales and Northern Ireland employing 5,000 and 7,000 FTE R&D staff respectively. These regions or countries also have the lowest corresponding totals of expenditure on business R&D.

The majority (91%) of UK R&D expenditure was carried out in England in 2016. Businesses in England spent the equivalent of £366 per head of population on performing R&D, more than the other countries of the UK, with Northern Ireland spending £258, Scotland spending £198 and Wales spending £140.

The largest overall increase in expenditure by region since 2015 was in London, which rose by £404 million (21.4%) from £1.9 billion in 2015. In contrast, the largest overall decrease in expenditure by region since 2015 was in the South East, which fell by £72 million (1.5%) from £4.8 billion in 2015.

Table 1 shows the change in expenditure on performing R&D by UK businesses between 2015 and 2016 for all regions of the UK.

Table 1: Regional expenditure on research and development performed in UK businesses, 2015 to 2016

	£ million		
	2015	2016	% change
UK	21,038	22,224	5.6
North East	306	302	-1.3
North West	2,116	2,346	10.9
Yorkshire and the Humber	769	750	-2.5
East Midlands	1,531	1,655	8.1
West Midlands	2,159	2,303	6.7
East of England	4,200	4,393	4.6
London	1,892	2,296	21.4
South East	4,765	4,693	-1.5
South West	1,476	1,500	1.6
Wales	368	435	18.2
Scotland	953	1,072	12.5
Northern Ireland	501	481	-4.0

Source: Office for National Statistics

Notes:

1. Differences may occur between totals and the sum of their independently rounded components.

10 . UK funding of business R&D continues to grow

The largest source of research and development (R&D) funding in 2016 was businesses' own funds at £16.2 billion, which increased by £1.4 billion (9%) from £14.8 billion in 2015. Businesses' own funds accounted for 73% of total business R&D expenditure in 2016 compared with the 2015 estimate of 70%.

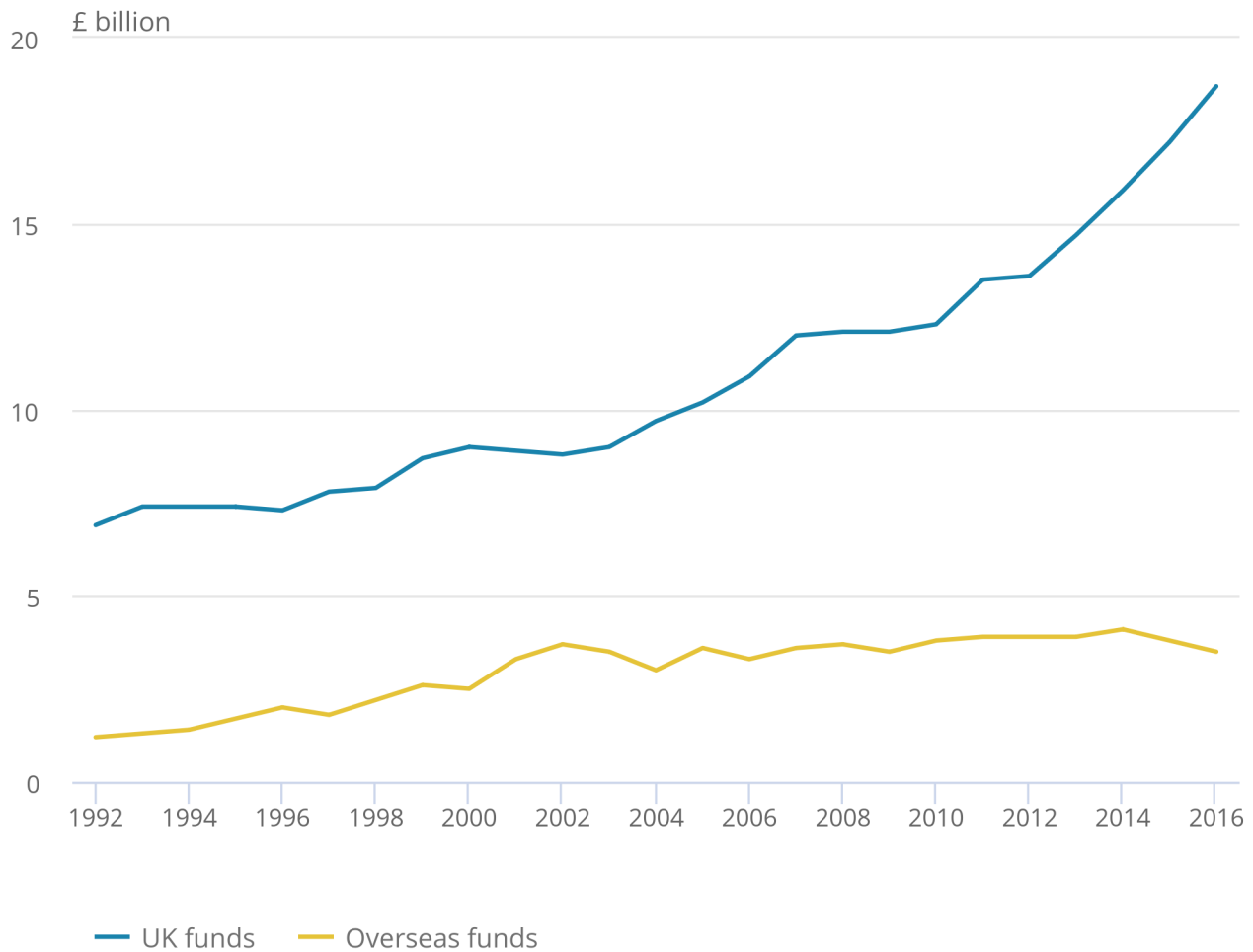
Since 2010, UK funding of businesses' expenditure on performing R&D has increased by £6.5 billion to £18.7 billion in 2016. Over the same period overseas funding has experienced little change with a drop of £301 million to £3.5 billion in 2016.

As a proportion of total funding of UK business R&D, overseas funding has reduced by 8 percentage points from 24% in 2010 to 16% in 2016 (Figure 5). This is due mainly to the large increase in UK investment in business R&D.

The UK government's funding of businesses' R&D in 2016 was £1.7 billion, a decrease of £86 million (5%) from £1.8 billion in 2015. This was a decrease for the second year running. It represented 8% of business R&D expenditure. UK government funding was mostly in the defence sector (£1.0 billion), which made up 57% of government funding of business R&D expenditure.

Figure 5: UK and overseas funding of expenditure by UK businesses on performing research and development, 1992 to 2016

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Source: Office for National Statistics

Source: Office for National Statistics

Notes:

1. Differences may occur between totals and the sum of their independently rounded components.

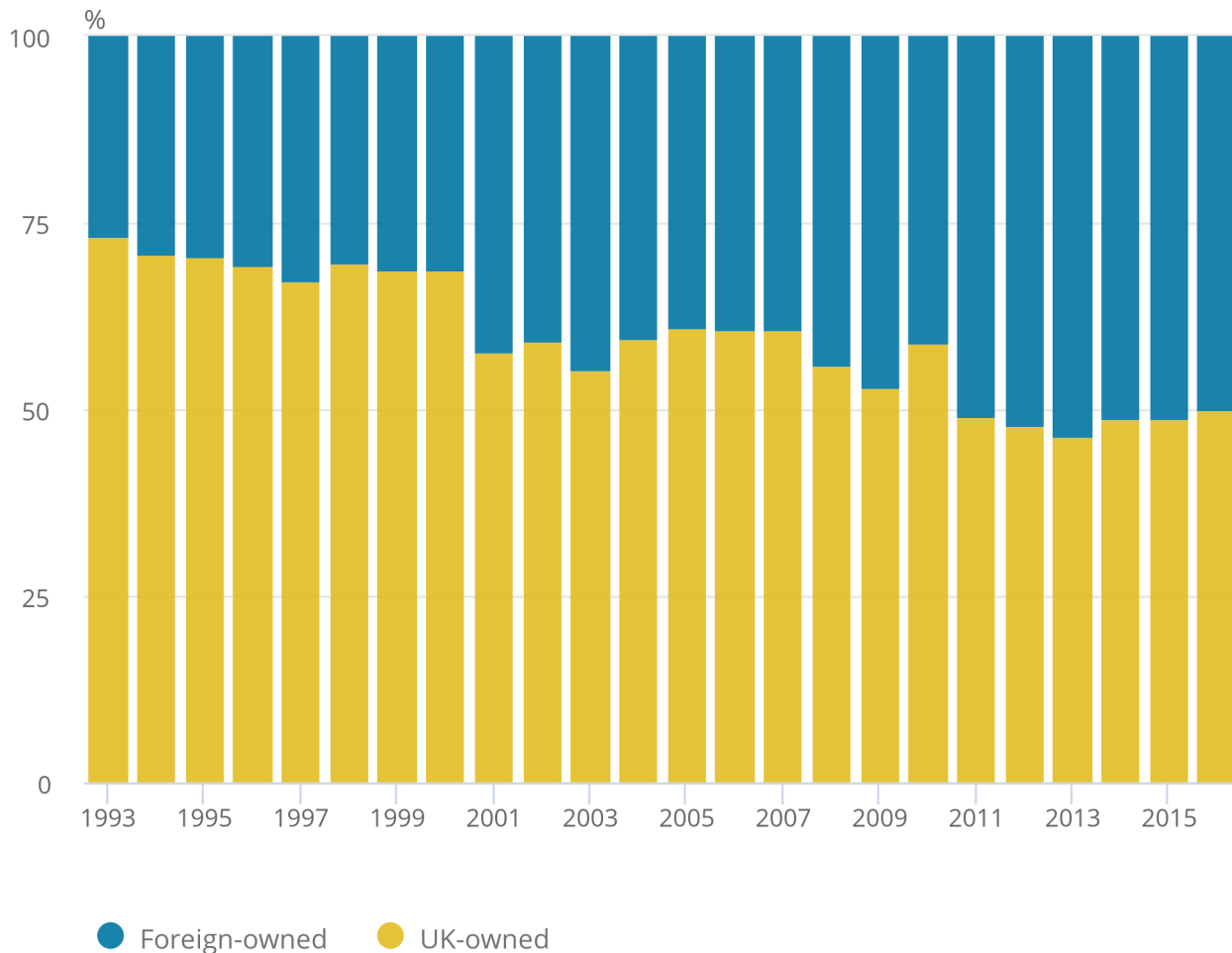
11 . Just over half of all UK business expenditure on performing R&D was by UK-owned businesses

In 1993, when the Business Enterprise Research and Development (BERD) Survey began on an annual basis, 73% of UK business R&D expenditure was by UK-owned businesses. The majority of UK business R&D expenditure continued to be performed by UK-owned businesses until 2011, when for the first time, just over half (50.8%) of business R&D expenditure in the UK was by foreign-owned businesses. This pattern of ownership continued in 2012 and 2013, with 52.1% and 53.6% respectively. For the first time since 2010, the proportion of R&D performed by UK-owned businesses was greater than that performed by foreign-owned businesses, at 50.1% in 2016 (Figure 6).

On 15 March 2013, ONS published [R&D expenditure by foreign-owned businesses](#), which contained more detailed analysis of the pattern of ownership of businesses that performed R&D between 1995 and 2011. This was based on the estimates that had been included in the 2011 BERD statistical bulletin. It should be noted that the original 2011 estimate of the proportion of R&D expenditure by foreign-owned businesses has been revised upwards from 50% to 51%.

Figure 6: Ownership of businesses who perform research and development in the UK, 1993 to 2016

Figure 6: Ownership of businesses who perform research and development in the UK, 1993 to 2016



Source: Office for National Statistics

Source: Office for National Statistics

Notes:

1. Differences may occur between totals and the sum of their independently rounded components.

12 . Links to related statistics

Further statistics on [research and development expenditure in the UK](#) are available.

13 . Quality and methodology

The [Business Enterprise Research and Development Quality and Methodology Information report](#) contains important information on:

- the strengths and limitations of the data and how they compare with related data
- uses and users of the data
- how the output was created
- the quality of the output including the accuracy of the data

About the data

These points should be noted when examining this bulletin or the data tables:

- respondents were asked to make a return for the calendar year 2016 or the nearest 12-month period for which figures were available – data for all years published in this statistical bulletin were collected on the same basis
- there may be differences between totals and the sum of their independently rounded totals
- in some tables, entries have been aggregated to avoid disclosure of figures in which the returns of individual businesses could be identified – where this happens, footnotes have been added to the tables
- it is sometimes necessary to suppress figures for certain items to avoid disclosing data from individual institutions – tables that contain data which are disclosive will contain a relevant footnote
- note that £1.0 billion equals £1,000 million in this release
- the 2014 and 2015 estimates have been revised where necessary to take account of businesses misreporting and late returns
- gross domestic product (GDP) deflators at market prices, and money GDP used is non-seasonally adjusted; the [GDP deflators at market prices, and money GDP: September 2017 \(Quarterly National Accounts\)](#) can be viewed as a measure of general inflation in the domestic economy

Research and Development in UK Businesses, 2016 - Datasets

Please click on the links below to access the datasets:

UK Business Enterprise Research and Development 2016 - Time Series Datasets

- [1](#) Expenditure on R&D Performed in UK Businesses: Current and Constant Prices and as a Percentage of GDP, 2005 to 2016
- [2](#) Expenditure on R&D Performed in UK Businesses: Detailed Product Groups, 2005 to 2016
- [3](#) Sources of Funds for R&D Performed in UK Businesses: 2005 to 2016
- [4](#) Employment in R&D Performed in UK Businesses: 2005 to 2016
- [5](#) Expenditure on R&D Performed in UK Businesses: Broad Product Groups, 2005 to 2016
- [6](#) Sources of Funds for R&D Performed in UK Businesses: Civil and Defence, 2005 to 2016
- [7](#) Breakdown of R&D Performed in UK Businesses by Country or Region: Expenditure and Employment, 2005 to 2016

UK Business Enterprise Research and Development 2016 - Additional Datasets

Expenditure on Research and Development

- [8](#) Current and Capital Expenditure on R&D Performed in UK Businesses: 2005 to 2016
- [9](#) Current and Capital Expenditure on R&D Performed in UK Businesses: Detailed Product Groups, 2016
- [10](#) Current Expenditure on R&D Performed in UK Businesses: Detailed Product Groups and Type of Research, 2016
- [11](#) Extramural Expenditure on R&D by UK R&D Performing Businesses: Detailed Product Groups and Source of Funds, 2016

Sources of Funds for Research and Development

- [12](#) Sources of Funds for R&D Performed in UK Businesses: Detailed Product Groups, 2016

Employment on Research and Development

- [13](#) Employment in R&D Performed in UK Businesses: Detailed Product Groups, 2016
- [14](#) Employment in Civil and Defence R&D Performed in UK Businesses: 2005 to 2016

Civil and Defence Research and Development

- [15](#) Expenditure on Civil and Defence R&D Performed in UK Businesses: Detailed Products Groups, 2016
- [16](#) Current and Capital Expenditure on Civil and Defence R&D in UK Businesses: 2005 to 2016

Region

- [17](#) Expenditure on R&D Performed in UK Businesses by Country or Region: Broad Product Groups, 2016
- [18](#) Employment in R&D Performed in UK Businesses by Country or Region: Broad Product Groups, 2016

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- [19](#) Expenditure and Employment on R&D Performed in UK Businesses: Top 100 Enterprise Groups, 2016
- [20](#) Expenditure on R&D Performed in UK Businesses by Total Company Employment Size-Bands: Broad Product Groups, 2016
- [21](#) R&D Employment in UK Businesses by Company Employment Size-Bands: Broad Product Groups, 2016

By Country of Ownership

- [22](#) Expenditure and Employment on R&D Performed in UK Businesses: By Country of Ownership of Business Performing R&D, 2005 to 2016
- [23](#) Expenditure on R&D Performed in UK Businesses, UK or Overseas Ownership: Detailed Product Groups, 2016

Intensity in Manufactured Products

- [24](#) R&D Intensity in Manufactured Products: Detailed Product Groups, 2005 to 2016

Small and Medium Size Enterprises

- [25](#) Expenditure on R&D Performed in UK Businesses: By Small and Medium Size Enterprises, 2005 to 2016

Standard Industry Classification (SIC) Division

- [26](#) Expenditure on R&D Performed in UK Businesses: Standard Industry Classification (SIC) Division, 2010 to 2016

Intensity in Services

- [27](#) R&D Intensity in Services: Detailed Product Groups, 2010 to 2016

[List of Broad Product Groups Numbers and Titles](#)

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**1 EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES:
CURRENT AND CONSTANT PRICES AND AS A PERCENTAGE OF GDP, 2005 TO 2016**

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		£ million											
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Current prices	DLBX	13,734	14,144	15,676	15,814	15,532	16,045	17,452	17,409	18,617	19,982[†]	21,038	22,224
Constant prices (2016)		16,923 [†]	16,899	18,275	17,969	17,396	17,648	18,923	18,492	19,443	20,570	21,513	22,224
Current prices													
GDP	DLHT	1,410,498[†]	1,484,679	1,552,938	1,556,181	1,540,259	1,599,416	1,640,153	1,700,300	1,773,683	1,849,131	1,902,142	1,981,282
As a % of GDP		1.0 [†]	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.1	1.1	1.1
2016 = 100											Source: Office for National Statistics		
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
GDP deflator used to convert current prices to constant prices		81.158 [†]	83.699	85.777	88.008	89.287	90.918	92.228	94.144	95.752	97.140	97.794	100

1[†] denotes earliest data revision.

**EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES:
DETAILED PRODUCT GROUPS, 2005 TO 2016
CURRENT PRICES**

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		£ million												% of total
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2016
TOTAL	DLBX	13,734	14,144	15,676	15,814	15,532	16,045	17,452	17,409	18,617	19,982 †	21,038	22,224	100
Agriculture, hunting and forestry; Fishing	DLBY	..	88	..	88	..	102	133	132	121	135	139	132	0.6
Extractive Industries	DLBZ	59	59	82	90	140	152	195	172	209	230	206	186	0.8
Food products and beverages; Tobacco products	DLCP	276	314	328	303	290	306	366	364	437	431	424	504	2.3
Textiles, clothing and leather products	DLCQ	18	17	19	15	10	11	14	20	22	22	19	21	0.1
Pulp, paper and paper products; Printing; Wood and straw products	DLC T	52	55	53	56	26	28	21	28	48	48	49	61	0.3
Refined petroleum products and coke oven products	DLCE	245	279	274	94	95	73	72	76	110	189	178	144	0.6
Chemicals and chemical products	DLCC	637	684	668	630	610	666	523	665	754	784	838	1,020	4.6
Pharmaceuticals	DLCD	3,374	3,521	3,935	4,354	4,424	4,673	4,914	4,208	4,039	3,855	4,165	4,122	18.5
Rubber and plastic products	DLCR	55	90	79	78	62	80	97	105	99	127	137	188	0.8
Other non-metallic mineral products	DLCS	44	51	48	53	57	56	60	47	47	62	54	64	0.3
Casting of iron and steel	DLCJ	34	38	..	47	43	28	44	45	27	51	40	30	0.1
Non-ferrous metals	DLCK	8	6	..	72	..	86	77	56	56	76	62	75	0.3
Fabricated metal products except machinery and equipment	DLCL	74	68	91	73	93	93	119	105	113	110	123	111	0.5
Machinery and equipment	DLCO	905	929	1,033	790	873	809	973	997	1,043	1,011	966	912	4.1
Computers and peripheral equipment	DLCN	92	67	83	123	151	157	180	187	260	276	316	328	1.5
Electrical equipment	DLCA	394	458	547	577	577	513	509	463	398	461	494	426	1.9
Consumer electronics and communication equipment	DLCB	788	748	667	700	547	474	511	689	877	912	989	837	3.8
Precision instruments and optical products; photographic equipment	DLCM	475	462	544	591	498	490	599	644	617	670	661	726	3.3
Motor vehicles and parts	DLCG	744	754	933	1,156	1,039	1,237	1,525	1,763	2,101	2,443	2,808	3,370	15.2
Other transport equipment	DLCI	21	25	28	30	..	46	50	48	64	78	93	90	0.4
Shipbuilding	DLCH	127	134	136	157	173	185	226	229	233	265	300	315	1.4
Aerospace	DLCF	2,169	1,832	2,070	1,732	1,466	1,437	1,438	1,511	1,639	1,666	1,699	1,905	8.6
Other manufactured goods	DLCU	26	24	27	36	98	136	146	133	175	183	191	167	0.8
Sewerage, waste management, remediation activities	DLCV	1	1	3	3	9	11	10	12	17	19	42	38	0.2
Electricity, gas and water supply	DLCW	15	21	35	40	66	60	58	106	123	148	155	118	0.5
Construction	DLCX	..	17	..	21	..	14	31	64	91	151	156	211	0.9
Wholesale and retail trade	DLDE	60	70	37	74	76	177	242	166	167	239	215	308	1.4
Transport and storage, incl. postal and courier activities	DLCY	8	16	21	12	24	17	18	..	35	38	46	43	0.2
Telecommunications	DLCZ	1,164	1,330	1,535	1,404	1,330	1,129	1,037	875	840	960	804	797	3.6
Miscellaneous business activities; Technical testing and analysis	DLDC	438	399	510	494	555	583	570	864	994	1,137	1,146	1,287	5.8
Computer programming and information service activities ⁶	DLDB	1,069	1,415	1,498	1,465	1,385	1,526	1,847	2,067	1,977	2,229	2,363	1,781	8.0
Software development ⁶	E4BM	-	-	-	-	-	-	-	-	-	-	-	744	3.3
Research and development services	DLDA	179	122	156	384	507	618	783	482	772	817	1,028	1,022	4.6
Public administration	DLDD	32	52	103	71	73	70	67	..	113	158	131	142	0.6

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 .. denotes disclosive figures.

3 † denotes earliest data revision.

4 Differences may occur between totals and the sum of their independently rounded components.

5 The sum of percentages may be more or less than 100 due to rounding.

6 Prior to 2016 Software development is included in the product group Computer programming and information service activities.

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3

**SOURCES OF FUNDS FOR R&D PERFORMED IN UK BUSINESSES:
2005 TO 2016
CURRENT PRICES**
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		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
£ million													
TOTAL	DLBX	13,734	14,144	15,676	15,814	15,532	16,045	17,452	17,409	18,617	19,982[†]	21,038	22,224
UK Government	DLDO	1,101	1,060	1,072	1,135	1,324	1,407	1,513	1,430	1,848	1,886 [†]	1,820	1,734
Overseas total of which:	DLHK	3,584	3,262	3,636	3,721	3,458	3,789	3,939	3,850	3,891	4,061 [†]	3,805	3,488
European Commission grants	DLDQ	73	41	27	47	47	62	55	55	65	64 [†]	67	98
Other Overseas	DLDS	3,512	3,221	3,609	3,674	3,411	3,727	3,884	3,796	3,826	3,996 [†]	3,737	3,390
Other UK Business	DLDU	1,272	1,155	994	865	698	718	595	344	364	391 [†]	384	523
Own funds	DLDW	7,775	8,665	9,959	10,086	10,047	10,129	11,283	11,696	12,407	13,515 [†]	14,817	16,219
Other ⁵	DLDY	2	2	15	7	4	3	122	88	107	129 [†]	212	259
Per cent													
TOTAL		100	100	100	100	100	100	100	100	100	100	100	100
UK Government		8	7	7	7	9	9	9	8	10	9 [†]	9	8
Overseas total of which:		26	23	23	24	22	24	23	22	21	20	18	16
European Commission grants		1	-	-	-	-	-	-	-	-	-	-	-
Other Overseas		26	23	23	23	22	23	22	22	21	20	18	15
Other UK Business		9	8	6	5	4	4	3	2	2	2	2	2
Own funds		57	61	64	64	65	63	65	67	67	68	70	73
Other ⁵		-	-	-	-	-	-	1	1	1	1	1	1

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2[†] denotes earliest data revision.

3 Differences may occur between totals and the sum of their independently rounded components.

4 The sum of percentages may be more or less than 100 due to rounding.

5 'Other' includes funds from UK Private Non-Profit organisations and Higher Education establishments, and from 2011, international organisations.

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4 EMPLOYMENT IN R&D PERFORMED IN UK BUSINESSES: 2005 TO 2016

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		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Full time equivalent in thousands													
TOTAL	DLEI	146	147	158	151	151	154	159	162	179	195[†]	206	210
Scientists and engineers	DLEJ	94	92	90	86	85	87	90	92	98	103 [†]	107	110
Technicians, laboratory assistants and draughtsmen	DLEK	25	27	35	37	40	41	42	43	53	60	64	62
Administrative, clerical, industrial and other staff	DLEL	26	28	33	28	26	27	27	27	28	32	35 [†]	37
<hr/>													
Per cent													
TOTAL		100	100	100	100	100	100	100	100	100	100	100	100
Scientists and engineers		64	63	57	57	56	56	57	57	55	53	52 [†]	52
Technicians, laboratory assistants and draughtsmen		17	18	22	25	26	27	26	27	30	31	31	30
Administrative, clerical, industrial and other staff		18	19	21	19	17	18	17	17	16	16	17	18

Source: Office for National Statistics

1 [†] denotes earliest data revision.

2 Differences may occur between totals and the sum of their independently rounded components.

3 The sum of percentages may be more or less than 100 due to rounding.

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**5 EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES:
BROAD PRODUCT GROUPS, 2005 TO 2016**

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		£ million											
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CURRENT PRICES													
TOTAL	DLBX	13,734	14,144	15,676	15,814	15,532	16,045	17,452	17,409	18,617	19,982 †	21,038	22,224
Manufacturing: Total	DLDG	10,560	10,555	11,612	11,672	11,230	11,585	12,462	12,383	13,158	13,721 †	14,607	15,416
Chemicals	DLDG	4,011	4,205	4,602	4,985	5,034	5,339	5,437	4,873	4,793	4,639	5,003 †	5,142
Mechanical engineering	DLDH	978	997	1,124	864	..	902	1,091	1,102	1,156	1,121	1,089 †	1,022
Electrical machinery	DLDI	1,274	1,273	1,297	1,400	1,275	1,144	1,200	1,339	1,535	1,649	1,799 †	1,592
Transport	DLDJ	892	913	1,097	1,344	..	1,468	1,800	2,040	2,398	2,785 †	3,201	3,775
Aerospace	DLDK	2,169	1,832	2,070	1,732	1,466	1,437	1,438	1,511	1,639	1,666	1,699 †	1,905
Other manufacturing	DLDL	1,236	1,336	1,422	1,348	1,251	1,295	1,495	1,518	1,638	1,860	1,816 †	1,981
Services	DLDM	2,949	3,404	3,860	3,904	3,952	4,120	4,563	4,539	4,898	5,577 †	5,733	6,124
Other: Total	LABA	225	185	205	238	350	340	426	487	561	684 †	697	684
Agriculture, hunting & forestry; Fishing	LADE	..	88	..	88	..	102	133	132	121	135	139	132
Extractive industries	LADM	59	59	82	90	140	152	195	172	209	230	206	186
Electricity, gas & water supply; Waste management	LAEB	15	21	35	40	75	72	68	118	140	168 †	196	156
Construction	LAEM	..	17	..	21	..	14	31	64	91	151	156 †	211

		£ million											
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CONSTANT PRICES (2016)													
TOTAL		16,923 †	16,899	18,275	17,969	17,396	17,648	18,923	18,492	19,443	20,570	21,513	22,224
Manufacturing: Total		13,012 †	12,611	13,537	13,262	12,577	12,742	13,512	13,153	13,742	14,125	14,936	15,416
Chemicals		4,942 †	5,024	5,365	5,664	5,638	5,872	5,895	5,176	5,006	4,776	5,116	5,142
Mechanical engineering		1,205 †	1,191	1,310	982	..	992	1,183	1,171	1,207	1,154	1,114	1,022
Electrical machinery		1,570 †	1,521	1,512	1,591	1,428	1,258	1,301	1,422	1,603	1,698	1,840	1,592
Transport		1,099 †	1,091	1,279	1,527	..	1,615	1,952	2,167	2,504	2,867	3,273	3,775
Aerospace		2,673 †	2,189	2,413	1,968	1,642	1,581	1,559	1,605	1,712	1,715	1,737	1,905
Other manufacturing		1,523 †	1,596	1,658	1,532	1,401	1,424	1,621	1,612	1,711	1,915	1,857	1,981
Services		3,634 †	4,067	4,500	4,436	4,426	4,532	4,948	4,821	5,115	5,741	5,862	6,124
Other: Total		277 †	221	239	270	392	374	462	517	586	704	713	684
Agriculture, hunting & forestry; Fishing		.. †	105	..	100	..	112	144	140	126	139	142	132
Extractive industries		73 †	70	96	102	157	167	211	183	218	237	211	186
Electricity, gas & water supply; Waste management		18	25 †	41	45	84	79	74	125	146	173	200	156
Construction		.. †	20	..	24	..	15	34	68	95	155	160	211

Source: Office for National Statistics

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
GDP deflator used to convert current prices to constant prices	81.158 †	83.699	85.777	88.008	89.287	90.918	92.228	94.144	95.752	97.140	97.794	100

1 .. denotes disclosive figures.

2 † denotes earliest data revision.

3 Differences may occur between totals and the sum of their independently rounded components.

4 [See list for detailed breakdown of broad product groups.](#)

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**6 SOURCES OF FUNDS FOR R&D PERFORMED IN UK BUSINESSES:
CIVIL AND DEFENCE, 2005 TO 2016
CURRENT PRICES**

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£ million

		Civil												Defence												
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
UK Government	DJLG	156	150	183	258	350	410	394	366	767	838 [†]	823	749	DLFN	945	910	889	877	974	996	1,119	1,064	1,081	1,047	997	986
Overseas total of which:	DLHS	2,656	2,686	2,985	3,189	3,206	3,584	3,788	3,691	3,732	3,914 [†]	3,654	3,354	DLIF	928	576	652	532	251	205	151	159	160	147	151	135
European Commission grants	DLFH	73	41	27	47	45	60	53	52	64	63 [†]	66	97	DLFO	-	-	1	-	2	2	3	2	1	1	1	1
Other Overseas	DLFI	2,583	2,645	2,958	3,143	3,161	3,524	3,735	3,639	3,668	3,850 [†]	3,588	3,257	DLFP	928	576	651	531	250	203	149	157	158	146 [†]	149	133
Other UK Business	DLFJ	1,147	1,044	..	729	..	607	485	277	..	339 [†]	328	444	DLFQ	125	111	..	136	..	111	109	68	..	53 [†]	56	80
Own	DLFK	7,326	8,093	9,196	9,534	9,503	9,787	10,922	11,392	12,096	13,225 [†]	14,536	15,859	DLFR	449	572	763	552	545	341	361	304	312	290	280	360
Other ⁵	DLFL	2	2	..	7	..	3	78	82	..	118 [†]	204	252	DLFS	-	-	..	-	..	1	44	6	..	11	8	7
TOTAL	DLBV	11,288	11,975	13,268	13,717	13,646	14,392	15,667	15,808	16,966	18,435[†]	19,546	20,658	DLBW	2,446	2,169	2,409	2,097	1,886	1,653	1,785	1,601	1,651	1,548[†]	1,491	1,567

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 - denotes disclosive figures.

3[†] denotes earliest data revision.

4 Differences may occur between totals and the sum of their independently rounded components.

5 'Other' includes funds from UK Private Non-Profit organisations and Higher Education establishments, and from 2011, international organisations.

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Area Code			Expenditure £ million													% of total 2016	Employment full time equivalent in thousands												
			2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2005		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		
K02000001	United Kingdom	DLBX	13,734	14,144	15,676	15,814	15,532	16,045	17,452	17,409	18,617	19,982 [†]	21,038	22,224	100	DLEI	146	147	158	151	151	154	159	162	179	195 [†]	206	210	
E92000001	England	DLKI	12,847	13,312	14,649	14,847	14,360	14,868	16,151	16,017	17,009	18,281 [†]	19,216	20,237	91.1	DLKJ	133	135	145	139	137	140	144	146	161	174	184	186	
E12000001	North East	DLJO	289	292	331	318	315	308	259	282	323	282	306	302	1.4	DLJZ	3	3	4	4	4	4	4	3	5	4	4	4	
E12000002	North West	DLJT	1,892	1,623	2,021	2,130	1,926	2,074	2,220	1,781	1,835	1,913	2,116 [†]	2,346	10.6	DLKE	15	16	17	16	14	14	13	13	13	15	17	17	
E12000003	Yorkshire and the Humber	DLJP	344	394	436	433	454	488	550	600	660	700	769 [†]	750	3.4	DLKA	6	6	7	7	7	7	8	8	9	10	10 [†]	10	
E12000004	East Midlands	DLJQ	1,006	985	1,062	976	992	1,137	1,146	1,218	1,340	1,473	1,531 [†]	1,655	7.4	DLKB	11	11	13	12	10	11	12	13	15	16	16	17	
E12000005	West Midlands	DLJN	721	915	995	886	847	886	1,281	1,460	1,684	1,924	2,159 [†]	2,303	10.4	DLJY	12	13	14	12	12	11	12	14	16	17	19	19	
E12000006	East of England	DLJR	3,718	3,650	3,992	4,182	3,812	3,846	3,639	3,606	4,137	4,094 [†]	4,200	4,393	19.8	DLKC	29	26	28	29	30	32	30	33	34	36 [†]	37	37	
E12000007	London	DLKL	552	882	1,067	1,109	907	877	1,118	1,570	1,291	1,724 [†]	1,892	2,296	10.3	DLKM	8	10	11	11	10	10	11	13	14	18	20	20	
E12000008	South East	DLJS	3,125	3,347	3,515	3,466	3,758	3,798	4,579	4,133	4,288	4,609 [†]	4,765	4,693	21.1	DLKD	36	37	37	35	36	36	37	37	39	42	43 [†]	42	
E12000009	South West	DLJM	1,201	1,232	1,229	1,345	1,349	1,454	1,359	1,367	1,450	1,561	1,476 [†]	1,500	6.7	DLJX	13	13	14	15	15	16	15	15	16	16	17	18	
W92000004	Wales	DLJU	232	216	308	243	243	234	252	268	367	386	368 [†]	435	2.0	DLKF	3	3	3	3	3	3	3	3	4	5	5	5	
S92000003	Scotland	DLJV	506	460	543	554	631	619	697	709	801	957 [†]	953	1,072	4.8	DLKG	7	6	7	7	7	7	8	8	10	11 [†]	12	12	
N92000002	Northern Ireland	DLJW	148	157	177	171	297	324	352	415	441	359 [†]	501	481	2.2	DLKH	3	3	3	2	3	4	4	5	5	5	6	7	

Source: Office for National Statistics

1[†] denotes earliest data revision.

2 Differences may occur between totals and the sum of their independently rounded components.

3 The sum of percentages may be more or less than 100 due to rounding.

8

CURRENT AND CAPITAL EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES:

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2005 TO 2016

CURRENT PRICES

													£ million
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TOTAL	DLBX	13,734	14,144	15,676	15,814	15,532	16,045	17,452	17,409	18,617	19,982[†]	21,038	22,224
Capital total	DLEA	1,168	956	1,070	865	928	927	1,051	1,132	1,034	1,627[†]	1,704	1,737
of which:													
Land and buildings	DLHO	204	154	201	185	221	143	126	111	161	454	487 [†]	391
Plant and machinery	DLHQ	964	802	869	680	706	784	925	1,021	873	1,173 [†]	1,216	1,346
Current total	DLEC	12,566	13,188	14,606	14,950	14,604	15,118	16,401	16,276	17,584	18,355[†]	19,334	20,488
of which:													
Salaries and wages	DLEE	6,354	6,782	7,697	7,539	7,723	7,937	8,109	8,475	9,281	9,707 [†]	10,309	10,504
Other	DLEG	6,212	6,407	6,908	7,410	6,881	7,181	8,292	7,801	8,302	8,648 [†]	9,025	9,983

Source: Office for National Statistics

1 [†] denotes earliest data revision.

2 Differences may occur between totals and the sum of their independently rounded components.

£ million

	Total	Capital Total	Current Total	Salaries and wages	Other current
TOTAL	22,224	1,737	20,488	10,504	9,983
Agriculture, hunting and forestry; Fishing	132	12	120	42	78
Extractive Industries	186	12	173	107	66
Food products and beverages; Tobacco products	504	31	473	260	213
Textiles, clothing and leather products	21	-	21	13	8
Pulp, paper and paper products; Printing; Wood and straw products	61	7	54	28	26
Refined petroleum products and coke oven products	144	6	138	74	64
Chemicals and chemical products	1,020	109	911	469	442
Pharmaceuticals	4,122	257	3,865	1,761	2,104
Rubber and plastic products	188	6	182	45	137
Other non-metallic mineral products	64	10	54	34	21
Casting of iron and steel	30	..	..	..	22
Non-ferrous metals	75	9	65	46	19
Fabricated metal products except machinery and equipment	111	8	103	56	47
Machinery and equipment	912	36	875	491	385
Computers and peripheral equipment	328	10	318	215	104
Electrical equipment	426	59	367	197	170
Consumer electronics and communication equipment	837	74	763	474	289
Precision instruments and optical products; photographic equipment	726	41	685	364	322
Motor vehicles and parts	3,370	273	3,097	1,122	1,975
Other transport equipment	90	3	87	42	46
Shipbuilding	315	-	314	172	142
Aerospace	1,905	103	1,802	924	878
Other manufactured goods	167	23	144	88	57
Sewerage, waste management, remediation activities	38	21	16	12	4
Electricity, gas and water supply	118	44	74	47	28
Construction	211	20	191	147	44
Wholesale and retail trade	308	23	285	183	102
Transport and storage, incl. postal and courier activities	43	..	..	..	8
Telecommunications	797	26	771	481	289
Miscellaneous business activities; Technical testing and analysis	1,287	80	1,206	800	407
Computer programming and information service activities ⁴	1,781	295	1,486	524	962
Software development ⁴	744	38	706	551	155
Research and development services	1,022	98	924	575	348
Public administration	142	1	141	119	22

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 .. denotes disclosive figures.

3 Differences may occur between totals and the sum of their independently rounded components.

4 Prior to 2016 Software development is included in the product group Computer programming and information service activities.

	£ million			
	Total current	Basic	Applied	Experimental Development
TOTAL	20,488	1,881	8,487	10,119
Agriculture, hunting and forestry; Fishing	120	-	36	84
Extractive Industries	173	6	132	35
Food products and beverages; Tobacco products	473	111	168	195
Textiles, clothing and leather products	21	2	11	8
Pulp, paper and paper products; Printing; Wood and straw products	54	-	13	41
Refined petroleum products and coke oven products	138	..	..	84
Chemicals and chemical products	911	21	456	434
Pharmaceuticals	3,865	213	1,586	2,065
Rubber and plastic products	182	6	166	9
Other non-metallic mineral products	54	9	19	27
Casting of iron and steel	..	..	..	29
Non-ferrous metals	65	-	33	32
Fabricated metal products except machinery and equipment	103	1	52	50
Machinery and equipment	875	51	388	437
Computers and peripheral equipment	318	-	229	89
Electrical equipment	367	11	71	285
Consumer electronics and communication equipment	763	35	399	329
Precision instruments and optical products; photographic equipment	685	8	330	348
Motor vehicles and parts	3,097	48	536	2,512
Other transport equipment	87	-	59	28
Shipbuilding	314	4	122	188
Aerospace	1,802	252	1,061	489
Other manufactured goods	144	5	76	63
Sewerage, waste management, remediation activities	16	..	..	7
Electricity, gas and water supply	74	15	17	42
Construction	191	11	84	95
Wholesale and retail trade	285	20	159	106
Transport and storage, incl. postal and courier activities	..	..	..	20
Telecommunications	771	1	177	593
Miscellaneous business activities; Technical testing and analysis	1,206	46	686	475
Computer programming and information service activities ⁴	1,486	771	374	340
Software development ⁴	706	47	400	260
Research and development services	924	104	543	277
Public administration	141	33	66	43

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 .. denotes disclosive figures.

3 Differences may occur between totals and the sum of their independently rounded components.

4 Prior to 2016 Software development is included in the product group Computer programming and information service activities.

11 EXTRAMURAL EXPENDITURE ON R&D BY UK R&D PERFORMING BUSINESSES: DETAILED PRODUCT GROUPS AND SOURCE OF FUNDS, 2016

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	£ million			
	Total	United Kingdom	Overseas Government Funded	Overseas Other funds
TOTAL	10,761	4,103	46	6,612
Agriculture, hunting and forestry; Fishing	..	..	-	..
Extractive Industries	29	26	-	4
Food products and beverages; Tobacco products	48	24	-	25
Textiles, clothing and leather products	1	1	-	-
Pulp, paper and paper products; Printing; Wood and straw products	4	1	-	3
Refined petroleum products and coke oven products	63	..	..	18
Chemicals and chemical products	85	41	-	44
Pharmaceuticals	7,295	..	..	4,328
Rubber and plastic products	8	-	-	8
Other non-metallic mineral products	2	-	-	2
Casting of iron and steel	-	-	-	-
Non-ferrous metals	2	1	-	1
Fabricated metal products except machinery and equipment	2	2	-	1
Machinery and equipment	24	12	-	12
Computers and peripheral equipment	..	6	-	..
Electrical equipment	19	9	-	10
Consumer electronics and communication equipment	460	5	-	455
Precision instruments and optical products; photographic equipment	344	30	..	..
Motor vehicles and parts	1,064	384	-	679
Other transport equipment	10	10	-	-
Shipbuilding	3	2	-	2
Aerospace	252	185	1	67
Other manufactured goods	46	11	-	35
Sewerage, waste management, remediation activities	2	2	-	-
Electricity, gas and water supply	37	11	-	26
Construction	11	11	-	-
Wholesale and retail trade	32	28	-	4
Transport and storage, incl. postal and courier activities	9	9	-	-
Telecommunications	52	32	-	20
Miscellaneous business activities; Technical testing and analysis	116	54	-	62
Computer programming and information service activities ⁵	32	..	..	18
Software development ⁵	94	20	-	73
Research and development services	246	173	-	73
Public administration	1	1	-	-

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 .. denotes disclosive figures.

3 Differences may occur between totals and the sum of their independently rounded components.

4 Extramural R&D is R&D conducted outside the business, in the UK and overseas, funded by the business. The survey covers only those businesses which perform intramural R&D. Businesses whose R&D expenditure is only extramural are excluded from the survey and therefore from these figures. Some businesses extramural expenditure may also be included as part of the intramural expenditure of other companies.

5 Prior to 2016 Software development is included in the product group Computer programming and

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12 SOURCES OF FUNDS FOR R&D PERFORMED IN UK BUSINESSES: DETAILED PRODUCT GROUPS, 2016

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£ million

	Total Expenditure	UK Government	Overseas	Own Funds	Other
TOTAL	22,224	1,734	3,488	16,219	782
Agriculture, hunting and forestry; Fishing	132	-	18	114	-
Extractive Industries	186	-	77	108	-
Food products and beverages; Tobacco products	504	2	184	313	5
Textiles, clothing and leather products	21	1	-	19	1
Pulp, paper and paper products; Printing; Wood and straw products	61	1	-	60	-
Refined petroleum products and coke oven products	144	..	-	..	-
Chemicals and chemical products	1,020	9	142	867	3
Pharmaceuticals	4,122	4	928	3,018	172
Rubber and plastic products	188	1	-	186	-
Other non-metallic mineral products	64	1	1	63	-
Casting of iron and steel	30	..	..	29	..
Non-ferrous metals	75	3	2	15	55
Fabricated metal products except machinery and equipment	111	2	62	47	-
Machinery and equipment	912	335	104	450	23
Computers and peripheral equipment	328	14	68	246	-
Electrical equipment	426	36	43	330	17
Consumer electronics and communication equipment	837	27	377	432	1
Precision instruments and optical products; photographic equipment	726	50	18	636	23
Motor vehicles and parts	3,370	54	517	2,756	43
Other transport equipment	90	20	..	..	..
Shipbuilding	315	266	6	42	-
Aerospace	1,905	215	214	1,395	81
Other manufactured goods	167	2	1	165	-
Sewerage, waste management, remediation activities	38	-	-	36	1
Electricity, gas and water supply	118	16	7	84	12
Construction	211	10	-	197	4
Wholesale and retail trade	308	15	..	290	..
Transport and storage, incl. postal and courier activities	43	4	8	22	10
Telecommunications	797	6	83	707	2
Miscellaneous business activities; Technical testing and analysis	1,287	223	127	869	68
Computer programming and information service activities ⁵	1,781	45	93	1,643	1
Software development ⁵	744	10	233	496	6
Research and development services	1,022	351	153	268	249
Public administration	142	9	20	113	-

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 .. denotes disclosive figures.

3 Differences may occur between totals and the sum of their independently rounded components.

4 'Other' includes funds from UK Private Non-Profit organisations and Higher Education establishments, and from 2011, international organisations.

5 Prior to 2016 Software development is included in the product group Computer programming and information service activities.

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	Full time equivalent in thousands			
	R&D Employment	Scientists and Engineers	Technicians laboratory assistants and draughtsmen	Administrative clerical and others
TOTAL	210	110	62	37
Agriculture, hunting and forestry; Fishing	1	-	-	-
Extractive Industries	1	1	-	-
Food products and beverages; Tobacco products	5	2	2	1
Textiles, clothing and leather products	-	-	-	-
Pulp, paper and paper products; Printing; Wood and straw products	2	1	-	-
Refined petroleum products and coke oven products	1	-	-	-
Chemicals and chemical products	10	5	4	1
Pharmaceuticals	24	10	5	8
Rubber and plastic products	2	1	1	-
Other non-metallic mineral products	1	-	-	-
Casting of iron and steel	-	-	-	-
Non-ferrous metals	1	-	-	-
Fabricated metal products except machinery and equipment	2	1	-	1
Machinery and equipment	12	6	4	3
Computers and peripheral equipment	3	3	-	-
Electrical equipment	5	3	1	1
Consumer electronics and communication equipment	9	7	1	-
Precision instruments and optical products; photographic equipment	9	6	2	1
Motor vehicles and parts	20	9	5	5
Other transport equipment	1	-	-	-
Shipbuilding	3	1	1	-
Aerospace	16	9	6	1
Other manufactured goods	3	1	1	1
Sewerage, waste management, remediation activities	-	-	-	-
Electricity, gas and water supply	1	-	-	-
Construction	4	1	1	2
Wholesale and retail trade	6	2	1	2
Transport and storage, incl. postal and courier activities	1	-	-	-
Telecommunications	9	5	3	1
Miscellaneous business activities; Technical testing and analysis	19	7	9	3
Computer programming and information service activities ³	16	7	8	1
Software development ³	10	5	4	1
Research and development services	13	9	1	2
Public administration	2	1	1	-

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 Differences may occur between totals and the sum of their independently rounded components.

3 Prior to 2016 Software development is included in the product group Computer programming and information service activities.

		Civil												Defence												Full time equivalent in thousands	
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		
Scientists and engineers	DLHD	77	76	76	74	74	77	81	83	89	94 ¹	98	101	DLHH	17	16	14	12	11	10	9	9	9	9	9		
Technicians laboratory assistants & draughtmen	DLHE	23	25	31	33	36	37	38	39	49	55 ¹	58	55	DLHI	2	2	3	4	4	4	4	4	5	5	6	7	
Admin. clerical industrial & other staff	DLHF	23	24	29	25	24	25	25	24	26	31	34	36	DLHJ	4	4	4	3	2	2	2	2	2	2	1 ¹	2	
TOTAL	DLHC	123	125	136	132	134	138	144	146	163	179¹	190	192	DLHG	23	22	22	19	18	16	15	16	16	16	16¹	17	

¹ ¹ denotes earliest data revision.

² Differences may occur between totals and the sum of their independently rounded components.

Source: Office for National Statistics

	£ million		
	Total	Civil	Defence
TOTAL	22,224	20,658	1,567
Agriculture, hunting and forestry; Fishing	132	132	-
Extractive Industries	186	186	-
Food products and beverages; Tobacco products	504	504	-
Pulp, paper and paper products; Printing; Wood and straw products	61	61	-
Chemicals and chemical products	1,020	1,020	-
Pharmaceuticals	4,122	4,122	-
Rubber and plastic products	188	186	2
Other non-metallic mineral products	64	64	-
Machinery and equipment	912	547	364
Electrical equipment	426	357	70
Consumer electronics and communication equipment	837	813	24
Precision instruments and optical products; photographic equipment	726	618	109
Shipbuilding	315	33	281
Aerospace	1,905	1,472	433
Sewerage, waste management, remediation activities	38	38	-
Electricity, gas and water supply	118	118	-
Miscellaneous business activities; Technical testing and analysis	1,287	1,177	110
Computer programming and information service activities ³	1,781	1,771	10
Software development ³	744	710	35
Research and development services	1,022	981	40
Other	5,838	5,748	90

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 Differences may occur between totals and the sum of their independently rounded components.

3 Prior to 2016 Software development is included in the product group Computer programming and information service activities.

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16 CURRENT AND CAPITAL EXPENDITURE ON CIVIL AND DEFENCE R&D IN UK BUSINESSES:
2005 TO 2016
CURRENT PRICES

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		Civil												Defence												£ million
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Capital total	DLGJ	932	731	834	824	891	907	1,024	1,101	1,000	1,599[†]	1,673	1,704	DLGT	236	225	236	41	36	20	27	32	34	29	31	33
of which:																										
Land & buildings	DLIH	184	..	..	185	220	142	124	109	151	453	483 [†]	388	DLIL	20	..	..	-	1	2	2	2	9	-	4	3
Plant & machinery	DLJU	747	..	..	639	671	766	900	991	849	1,145 [†]	1,189	1,315	DLIN	217	..	..	41	35	18	25	30	24	28	27	30
Current total	DLGP	10,356	11,244	12,434	12,894	12,755	13,485	14,643	14,707	15,966	16,836[†]	17,874	18,954	DLGZ	2,210	1,944	2,172	2,056	1,850	1,633	1,758	1,569	1,618	1,519	1,460	1,534
of which:																										
Salaries & Wages	DLGL	5,451	5,767	6,508	6,488	6,783	7,095	7,223	7,611	8,433	8,886 [†]	9,490	9,631	DLGV	903	1,015	1,190	1,052	941	842	886	864	848	821	819 [†]	874
Other	DLGN	4,905	5,477	5,926	6,406	5,972	6,390	7,420	7,096	7,533	7,949 [†]	8,384	9,323	DLGX	1,307	929	982	1,004	909	791	872	705	769	698	642	660
TOTAL	DLBV	11,288	11,975	13,268	13,717	13,646	14,392	15,667	15,808	16,966	18,435[†]	19,546	20,658	DLBW	2,446	2,169	2,409	2,097	1,886	1,653	1,785	1,601	1,651	1,548[†]	1,491	1,567

Source: Office for National Statistics

- 1 - denotes nil, figures unavailable or too small to display.
- 2 - denotes disclosure figures.
- 3 † denotes earliest data revision.
- 4 Differences may occur between totals and the sum of their independently rounded components.

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**17 EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES BY COUNTRY OR REGION:
BROAD PRODUCT GROUPS, 2016**

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£ million

Area Code	TOTAL		North East	North West	Yorkshire and the Humber			East Midlands	West Midlands	East of England	London	South		Wales	Scotland	Northern Ireland
	UK	England			East	West	East					West	East				West
	K02000001	E92000001	E12000001	E12000002	E12000003	E12000004	E12000005	E12000006	E12000007	E12000008	E12000009	E12000009	W92000004	S92000003	N92000002	
TOTAL	22,224	20,238	302	2,346	750	1,655	2,303	4,393	2,296	4,693	1,500	435	1,072	481		
Manufacturing: Total	15,416	14,179	202	2,000	550	1,455	1,970	3,302	412	3,136	1,152	361	592	284		
Chemicals	5,142	4,871	98	698	232	155	35	1,771	253	1,575	54	58	167	47		
Mechanical engineering	1,022	914	40	32	43	50	116	328	9	213	83	30	39	40		
Electrical machinery	1,592	1,298	15	50	60	35	57	361	71	348	301	43	212	37		
Transport	3,775	3,702	17	..	..	..	1,512	571	9	360	59	41	..	..
Aerospace	1,905	1,700	4	..	..	..	102	28	13	214	531	116	..	..
Other manufacturing	1,981	1,693	28	322	161	184	148	242	57	427	124	73	148	66		
Services	6,124	5,502	92	294	177	166	299	1,038	1,819	1,308	309	68	366	187		
Other: Total	684	556	7	52	23	34	34	53	65	248	40	6	114	9		
Agriculture, hunting & forestry; Fishing	132	123	..	-	..	..	..	2	..	..	..	..	8	..
Extractive industries	186	115	-	-	2	..	..	..	..	..	..	1	67	3
Electricity, gas & water supply; Waste management	156	130	..	32	..	7	7	..	22	31	20	..	22	..		
Construction	211	187	3	19	15	17	22	31	29	49	2	3	18	4		

Source: Office for National Statistics

- 1 - denotes nil, figures unavailable or too small to display.
- 2 .. denotes disclosive figures.
- 3 Differences may occur between totals and the sum of their independently rounded components.
- 4 [See list for detailed breakdown of broad product groups](#)

18 EMPLOYMENT IN R&D PERFORMED IN UK BUSINESSES BY COUNTRY OR REGION:
BROAD PRODUCT GROUPS, 2016

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Full time equivalent in thousands

Area Code	TOTAL		Yorkshire										Northern	
	UK	England	North East	North West	and the Humber	East Midlands	West Midlands	East of England	London	South East	South West	Wales	Scotland	Ireland
	K02000001	E92000001	E12000001	E12000002	E12000003	E12000004	E12000005	E12000006	E12000007	E12000008	E12000009	W92000004	S92000003	N92000002
TOTAL	210	184	4	17	10	17	19	37	20	42	18	5	12	7
Manufacturing: Total	128	115	3	13	7	14	14	23	4	24	13	4	6	4
Chemicals	34	32	1	4	3	2	1	9	2	9	1	1	2	1
Mechanical engineering	14	13	1	1	..	..	2	3	-	3	1	-	1	1
Electrical machinery	16	14	-	1	1	1	1	4	1	3	4	-	2	-
Transport	23	23	-	3	1	3	8	4	-	2	1	-	-	-
Aerospace	16	14	-	1	..	..	1	-	-	2	4	1	-	1
Other manufacturing	24	21	-	3	2	2	2	3	1	4	2	1	2	1
Services	75	67	..	4	..	3	5	13	16	16	5	..	5	..
Other: Total	7	6	..	-	..	-	-	1	1	2	-	..	1	..
Agriculture, hunting & forestry; Fishing	1	1	..	-	..	..	-	-	-	..	-	..	-	..
Extractive industries	1	1	-	-	..	..	..	..	-	..	-	-	1	-
Electricity, gas & water supply; Waste management	1	1	..	-	-	-	-	..	-	-	-	..	-	-
Construction	4	3	-	-	-	-	-	1	1	1	-	-	-	..

Source: Office for National Statistics

- 1 - denotes nil, figures unavailable or too small to display.
- 2 .. denotes disclosive figures.
- 3 Differences may occur between totals and the sum of their independently rounded components.
- 4 [See list for detailed breakdown of broad product groups](#)

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EXPENDITURE AND EMPLOYMENT ON R&D PERFORMED IN UK BUSINESSES:
TOP 100 ENTERPRISE GROUPS, 2016[Return to Main Menu](#)

	R&D Employment (Full time equivalent in thousands)	Total Expenditure (£ million)	Funded by UK Government (£ million)
TOTAL OF ALL ENTERPRISES	210	22,224	1,734
Enterprise groups with the largest expenditure on R&D			
Top 5	21	4,514	..
Top 10	32	6,312	..
Top 15	44	7,389	721
Top 20	51	8,185	736
Top 50	71	11,147	950
Top 100	91	13,568	1,146

Source: Office for National Statistics

- 1 .. denotes disclosive figures.
- 2 An Enterprise Group consists of all the enterprises under the control of the same owner.

	£ million							
	TOTAL ALL EMPLOYEES	0 to 99 employees	100 to 399 employees	400 to 999 employees	1,000 to 4,999 employees	5,000 to 9,999 employees	10,000 to 19,999 employees	20,000 employees and over
TOTAL	22,224	2,610	3,605	3,991	6,977	1,947	395	2,701
Manufacturing: Total	15,416	1,009	2,591	3,042	5,563	963	..	..
Chemicals	5,142	384	863	1,089	2,796	-	..	..
Mechanical engineering	1,022	153	198	196	343	..	..	-
Electrical machinery	1,592	177	503	358	553	-	-	-
Transport	3,775	54	251	459	1,064	511	..	..
Aerospace	1,905	18	157	259	349	..	..	..
Other manufacturing	1,981	223	619	680	458	..	..	-
Services	6,124	1,571	949	758	1,180	852	232	583
Other: Total	684	30	65	191	234	132	32	-
Agriculture, hunting & forestry; Fishing	132	7	10	..	-	..	-	-
Extractive industries	186	8	..	35	121	..	-	-
Electricity, gas & water supply; Waste management	156	2	7	..	50	..	..	-
Construction	211	14	27	28	62	79	..	..

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 .. denotes disclosive figures.

3 Differences may occur between totals and the sum of their independently rounded components.

4 [See list for detailed breakdown of broad product groups](#)

**21 R&D EMPLOYMENT IN UK BUSINESSES BY COMPANY EMPLOYMENT SIZE-BANDS:
BROAD PRODUCT GROUPS, 2016**

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	Full time equivalent in thousands							
	TOTAL ALL EMPLOYEES	0 to 99 employees	100 to 399 employees	400 to 999 employees	1,000 to 4,999 employees	5,000 to 9,999 employees	10,000 to 19,999 employees	20,000 employees and over
TOTAL	210	44	42	35	49	17	2	21
Manufacturing: Total	128	18	28	24	34	9	..	..
Chemicals	34	4	6	9	15	-	..	..
Mechanical engineering	14	3	3	2	3	..	..	-
Electrical machinery	16	3	6	3	4	-	-	-
Transport	23	2	2	3	5	4	..	..
Aerospace	16	-	1	2	3	..	..	..
Other manufacturing	24	6	8	5	5	..	-	..
Services	75	26	12	10	13	6	1	7
Other: Total	7	1	2	1	2	2	-	-
Agriculture, hunting & forestry; Fishing	1	-	-	..	-	-	-	-
Extractive industries	1	-	..	-	1	-	..	-
Electricity, gas & water supply; Waste management	1	-	..	..	-	-	-	-
Construction	4	-	1	..	1	1	..	-

Source: Office for National Statistics

- 1 - denotes nil, figures unavailable or too small to display.
- 2 .. denotes disclosive figures.
- 3 Differences may occur between totals and the sum of their independently rounded components.
- 4 [See list for detailed breakdown of broad product groups](#)

		Expenditure £ million											Employment full time equivalent in thousands													
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016													
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
TOTAL	DLBX	13,734	14,144	15,676	15,814	15,532	16,045	17,452	17,409	18,617	19,982[†]	21,038	22,224	DLEI	146	147	158	151	151	154	159	162	179	195[†]	206	210
United Kingdom	GFWP	8,360	8,583	9,512	8,874	8,231	9,458	8,579	8,332	8,640	9,737 [†]	10,289	11,139	GFWO	91	89	94	83	82	94	88	88	97	111 [†]	119	120
United States	GFWR	2,570	2,781	3,122	3,366	3,402	3,103	4,003	3,818	4,116	3,928	4,195 [†]	3,928	GFWQ	27	31	33	34	32	29	33	33	37	38	39 [†]	37
Germany	GFWT	243	218	353	394	363	359	444	450	527	586	643 [†]	864	GFWV	3	2	4	4	4	4	3	4	4	4	5	5
France	GFWV	870	1,025	692	688	784	747	1,022	971	645	663	640 [†]	666	GFWU	8	9	6	6	6	6	7	7	5	5	5	5
Other EU	GFWX	877	878	1,159	1,142	1,242	1,190	1,204	1,438	1,773	2,146 [†]	2,212	2,351	GFWW	8	9	11	11	13	12	12	13	15	16	18 [†]	17
Japan	GFWZ	284	225	303	378	409	363	468	470	581	531	603 [†]	665	GFWY	3	3	3	4	4	3	3	3	4	4	4	5
Rest of the world	GFXB	529	435	536	972	1,100	826	1,732	1,929	2,334	2,390	2,455 [†]	2,611	GFXA	5	5	6	10	10	7	13	14	18	17	18	20

Source: Office for National Statistics

1 [†] denotes earliest data revision.

2 Differences may occur between totals and the sum of their independently rounded components.

£ million

	United Kingdom	Overseas	Total
TOTAL	11,139	11,086	22,224
Agriculture, hunting and forestry; Fishing	..	..	132
Extractive Industries	100	86	186
Food products and beverages; Tobacco products	290	214	504
Textiles, clothing and leather products	13	8	21
Pulp, paper and paper products; Printing; Wood and straw products	53	8	61
Refined petroleum products and coke oven products	..	..	144
Chemicals and chemical products	594	426	1,020
Pharmaceuticals	2,163	1,958	4,122
Rubber and plastic products	95	93	188
Other non-metallic mineral products	16	48	64
Casting of iron and steel	15	15	30
Non-ferrous metals	64	10	75
Fabricated metal products except machinery and equipment	56	55	111
Machinery and equipment	325	587	912
Computers and peripheral equipment	64	265	328
Electrical equipment	261	165	426
Consumer electronics and communication equipment	268	570	837
Precision instruments and optical products; photographic equipment	339	387	726
Motor vehicles and parts	431	2,938	3,370
Other transport equipment	35	56	90
Shipbuilding	288	27	315
Aerospace	1,156	749	1,905
Other manufactured goods	110	58	167
Sewerage, waste management, remediation activities	..	..	38
Electricity, gas and water supply	54	64	118
Construction	113	98	211
Wholesale and retail trade	218	90	308
Transport and storage, incl. postal and courier activities	39	5	43
Telecommunications	653	144	797
Miscellaneous business activities; Technical testing and analysis	885	402	1,287
Computer programming and information service activities ³	1,195	586	1,781
Software development ³	210	535	744
Research and development services	802	220	1,022
Public administration	125	18	142

Source: Office for National Statistics

1 .. denotes disclosive figures.

2 Differences may occur between totals and the sum of their independently rounded components.

3 Prior to 2016 Software development is included in the product group Computer programming and information service activities.

24 R&D INTENSITY IN MANUFACTURED PRODUCTS:
DETAILED PRODUCT GROUPS, 2005 TO 2016
 CURRENT PRICES

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	DLDF	R&D expenditure (£ million)													DLIQ	R&D as a percentage of sales												
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2005		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		
Manufacturing: Total		10,560	10,555	11,612	11,672	11,230	11,585	12,462	12,383	13,158	13,721 ¹	14,607	15,416		3.4	3.3	3.5	3.3	3.7	3.3	3.6	3.6	3.7	4.0	4.2			
Food products and beverages; Tobacco products	DLCP	276	314	328	303	290	306	366	364	437	431	424 ¹	504	DLJF	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.6	0.6	0.5	0.7		
Textiles, clothing and leather products	DLCO	18	17	19	15	10	11	14	20	22	22	19	21	DLJG	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3		
Pulp, paper and paper products; Printing; Wood and straw products	DLCT	52	55	53	56	26	28	21	28	48	48	49 ¹	61	DLJJ	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2		
Refined petroleum products and coke oven products	DLCE	245	279	274	94	95	73	72	76	110	189	178	144	LDOP	-	-	-	-	8.5	6.0	5.7	7.9	11.1	20.9 ¹	23.5	18.0		
Chemicals and chemical products	DLOC	637	684	668	630	610	666	523	665	754	784	838 ¹	1,020	DLIT	2.7	2.7	2.7	2.7	3.0	3.0	2.3	3.0	3.4	3.7 ¹	4.3	5.2		
Pharmaceuticals	DLDG	3,374	3,521	3,935	4,354	4,424	4,573	4,914	4,208	4,039	3,855	4,165 ¹	4,122	DLIU	32.2	32.6	33.9	42.7	36.2	31.7	34.8	34.3	33.4	35.0 ¹	38.3	33.2		
Rubber and plastics	DLCR	55	90	79	78	62	80	97	105	99	127	137	188	DLJH	0.3	0.5	0.5	0.6	0.6	0.6	0.7	0.8	0.7	0.8	0.9	1.2		
Other non-metallic mineral products	DLCS	44	51	48	53	57	56	60	47	47	62	54	64	DLJI	0.4	0.5	0.4	0.5	0.6	0.6	0.6	0.5	0.5	0.5 ¹	0.4	0.5		
Casting of iron and steel	DLGJ	34	38	...	47	43	28	44	45	27	51	40 ¹	30	DLIZ	1.1	1.2	...	1.7	2.0	1.3	1.6	1.7	1.1	2.3 ¹	2.2	2.0		
Non-ferrous metals	DLCK	8	6	...	72	...	86	77	56	56	76	62	75	DLJA	0.2	0.1	...	1.3	...	1.8	1.5	1.3	1.3	1.9	1.6	2.1		
Fabricated metal products except machinery and equipment	DLCL	74	68	91	73	93	93	119	105	113	110	123 ¹	111	DLIB	0.4	0.3	0.4	0.3	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5		
Machinery and equipment	DLOO	905	929	1,033	790	873	809	973	997	1,043	1,011	966 ¹	912	DLIE	3.6	3.6	3.7	2.5	3.6	2.9	3.2	3.2	3.4	3.2	3.3 ¹	3.3		
Computers and peripheral equipment	DLCN	92	67	83	123	151	157	180	187	260	276	316	328	DLID	2.2	2.6	4.3	7.0	8.5	9.2	9.9	9.5	12.3	14.7 ¹	17.1	16.8		
Electrical equipment	DLCA	394	458	547	577	577	513	509	463	398	461	494 ¹	426	DLIR	4.1	4.5	5.3	4.5	5.3	4.2	3.9	3.7	3.3	4.1 ¹	4.3	3.7		
Consumer electronics and communication equipment	DLCB	788	748	667	700	547	474	511	689	877	912	989	837	DLIS	10.7	9.7	11.0	20.9	14.3	11.6	17.0	26.0	35.1	46.2 ¹	45.2	38.0		
Precision instruments and optical products; photographic equipment	DLCM	475	482	544	591	498	490	599	644	617	670	661 ¹	726	DLJC	5.1	4.8	5.6	5.9	5.1	4.7	5.6	5.9	5.4	5.7	5.6	6.3		
Motor vehicles and parts	DLCG	744	754	933	1,156	1,039	1,237	1,525	1,763	2,101	2,443 ¹	2,808	3,370	DLIW	2.1	2.2	2.6	3.2	3.9	3.4	4.0	4.5	4.7	5.2 ¹	5.8	6.2		
Other transport equipment	DLCI	21	25	28	30	...	46	50	48	64	78	93	90	DLIV	1.1	1.4	0.7	0.6	...	1.1	1.1	1.0	1.3	1.6	1.9	1.9		
Shipbuilding	DLCB	127	134	138	157	173	185	226	229	233	265	300	315	DLIX	10.3	10.3	9.1	4.5	4.8	4.6	5.6	4.6	4.0	5.3	5.3 ¹	5.7		
Aerospace	DLCF	2,169	1,832	2,070	1,732	1,466	1,437	1,438	1,511	1,639	1,666	1,699 ¹	1,905	DLIV	22.7	18.9	18.8	10.3	7.8	8.0	7.7	7.4	6.9	6.9 ¹	7.4	7.4		
Other manufactured goods	DLCU	26	24	27	36	98	136	146	133	175	183	191	167	DLJK	0.3	0.3	0.2	0.2	0.6	0.9	0.9	0.8	1.0	1.0	1.0	0.9		

Source: Office for National Statistics

- 1 - denotes nil, figures unavailable or too small to display.
- 2 - denotes disclosure figures.
- 3¹ denotes earliest data revision.
- 4 Differences may occur between totals and the sum of their independently rounded components.
- 5 R&D intensity in each product group is estimated by dividing the R&D expenditure of the product group by the sales of the associated manufactured products derived from the Products of the European Community (PRODCOM) Survey.
- 6 Total sales is a narrower measure than total turnover as used in the estimates in table 27 (R&D Intensity in services) so the two measures are not directly comparable.

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**EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES:
BY SMALL AND MEDIUM SIZE ENTERPRISES, 2005 TO 2016**

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	CURRENT PRICES				£ million
	Total Expenditure DLBX	250 employees and over SFAA	0 to 249 employees SEZU	of which, SME SEZY	
2005	13,734	11,515	2,220	456	
2006	14,144	12,126	2,019	336	
2007	15,676	12,626	3,050	405	
2008	15,814	12,991	2,823	342	
2009	15,532	12,569	2,962	543	
2010	16,045	12,761	3,284	556	
2011	17,452	13,656	3,797	620	
2012	17,409	12,748	4,661	763	
2013	18,617	14,366	4,251	656	
2014	19,982 [†]	15,351 [†]	4,631 [†]	766 [†]	
2015	21,038	16,217	4,820	979	
2016	22,224	17,660	4,565	963	

1 The definition of SME used is that under the European Commission Recommendation (2003/361/EC) of 1 January 2005, in which SMEs are defined as being enterprises with less than 250 employees, and also a criterion of independence is used to exclude enterprises that are part of a larger enterprise group. To apply this definition, historic information on company ownership has been obtained using that currently held on the ONS IDBR. Caution should therefore be used in making comparisons over time.

2 [†] denotes earliest data revision.

3 Differences may occur between totals and the sum of their independently rounded components.

EXPENDITURE ON R&D PERFORMED IN UK BUSINESSES:
STANDARD INDUSTRY CLASSIFICATION (SIC) DIVISION, 2010 to 2016
CURRENT PRICES

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		£ million						
SIC	Industry description	2010	2011	2012	2013	2014	2015	2016
01-03	Agriculture, forestry and fishing	14	12	14	10	13	15	22
05-09	Mining and quarrying	137	174	143	183	183	159	166
10	Manufacture of food products	136	212	197	243	243	242	283
11-12	Manufacture of beverages and tobacco products	95	80	84	96	87	16	29
13	Manufacture of textiles	9	24	27	17	17	14	18
14	Manufacture of wearing apparel	1	1	3	3	3	3	2
15	Manufacture of leather and related products	1	1	2	3	2	2	2
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	3	1	4	7	7	6	9
17	Manufacture of paper and paper products	9	9	7	11	12	12	12
18	Printing and reproduction of recorded media	5	5	11	19	22	26	27
19	Manufacture of coke and refined petroleum products	--	--	--	--	--	89	42
20	Manufacture of chemicals and chemical products	319	284	262	346	366	324 †	481
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	474	528	477	436	400	388	383
22	Manufacture of rubber and plastic products	68	81	100	95	109	134	130
23	Manufacture of other non-metallic mineral products	41	41	34	34	49	42	51
24	Manufacture of basic metals	49	88	63	44	71	61 †	65
25	Manufacture of fabricated metal products, except machinery and equipment	594	551	495	530	464	479 †	461
26	Manufacture of computer, electronic and optical products	835	982	987	1,022	1,002	988 †	1,090
27	Manufacture of electrical equipment	165	152	170	157	181	210 †	175
28	Manufacture of machinery and equipment n.e.c.	607	634	764	727	747	868 †	831
29	Manufacture of motor vehicles, trailers and semi-trailers	1,039	1,296	1,478	1,748	2,039	2,359	2,948
30	Manufacture of other transport equipment	1,158	1,198	1,397	1,439	1,558	1,602 †	1,813
31	Manufacture of furniture	33	50	36	51	38	40	43
32	Other manufacturing	143	117	104	126	123	183 †	155
33	Repair and installation of machinery and equipment	156	77	83	105	131	159 †	147
35	Electricity, gas, steam and air conditioning supply	13	21	60	85	82	91	67
36	Water collection, treatment and supply	9	6	10	13	30	31	30
37-39	Sewerage, waste management, remediation activities	7	7	11	15	12	30 †	30
41-43	Construction	45	46	60	95	103	98 †	126
45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles	760	736	671	691	703	891 †	850
49	Land transport and transport via pipelines	2	6	--	2	3	8	6
50	Water transport	--	--	--	--	--	--	--
51	Air transport	--	--	--	--	--	--	--
52-53	Warehousing and support activities for transportation; postal and courier activities	27	24	--	14	20	24	22
55-56	Accommodation and food service activities	19	27	27	16	29	38	62
58	Publishing activities	44	61	52	88	84	82	82
59	Motion picture, video and television programme production, sound recording and music publishing activities	18	17	11	22	27	25	22
60	Programming and broadcasting activities	3	6	7	11	--	--	--
61	Telecommunications	826	719	701	729	798	691 †	748
62	Computer programming, consultancy and related activities	1,109	1,523	1,627	1,646	1,649	1,713 †	1,644
63	Information service activities	45	44	198	139	169	200	183
64-66	Financial and insurance activities	308	302	253	363	438 †	435	399
68	Real estate activities	10	10	12	17	22	20	14
69	Legal and accounting activities	19	12	15	28	31	39	19
70	Activities of head offices; management consultancy activities	54	51	69	86	112	140 †	205
71	Architectural and engineering activities	748	885	1,399	1,479	1,596 †	1,633	1,453
72	Scientific research and development	5,510	5,863	4,700	4,878	4,982	5,337 †	5,327
73	Advertising and market research	15	14	15	19	29	33	42
74	Other professional, scientific and technical activities	7	25	29	90	96	91	107
75	Veterinary activities	1	--	1	1	2	2	3
77	Rental and leasing activities	21	55	55	145	159	183	176
78	Employment activities	12	11	15	21	31	32	35
79	Travel agency, tour operator and other reservation service and related activities	7	6	8	17	28	13	14
80	Security and investigation activities	3	3	5	7	9	15	15
81	Services to buildings and landscape activities	7	11	11	12	18	23	15
82	Office administrative, office support and other business support activities	80	102	178	98	219	200	213
84-85	Public administration and defence; compulsory social security and education	--	--	11	13	16	10	10
86-88	Human health and social work activities	25	18	17	28	36	53	61
90-93	Arts, entertainment and recreation	152	192	181	190	254 †	235	298
94-99	Other service activities; Activities of households as employers and of extraterritorial organisations and bodies	27	25	25	35	27	30 †	31
TOTAL		16,045	17,452	17,409	18,617	19,982 †	21,038	22,224

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 .. denotes disclosive figures.

3 † denotes earliest data revision.

4 Differences may occur between totals and the sum of their independently rounded components.

5 [Standard Industrial Classification 2007 \(SIC\)](#)

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	R&D expenditure (£ million)							R&D as a percentage of turnover						
	2010	2011	2012	2013	2014	2015	2016	2010	2011	2012	2013	2014	2015	2016
Services: Total	4,120	4,563	4,539	4,898	5,578 †	5,733	6,124	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Wholesale and retail trade	177	242	166	167	239 †	215	308	-	-	-	-	-	-	-
Transport and storage, incl. postal and courier activities	17	18	..	35	38	46 †	43	-	-	..	-	-	-	-
Telecommunications	1,129	1,037	875	840	960 †	804	797	1.7	1.6	1.4	1.3	1.6 †	1.3	1.2
Miscellaneous business activities; Technical testing and analysis	583	570	864	994	1,137 †	1,146	1,287	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Computer programming and information service activities 7	1,526	1,847	2,067	1,977	2,229	2,363 †	1,781	2.2	2.5	2.6	2.3	2.4	2.4	2.3
Software development 7	-	-	-	-	-	-	744	-	-	-	-	-	-	2.9
Research and development services	618	783	482	772	817	1,028 †	1,022	3.8	4.9	3.0	5.0	5.3	6.3 †	5.4
Public administration	70	67	..	113	158 †	131	142	-	-	..	-	0.1 †	0.1	0.1

Source: Office for National Statistics

1 - denotes nil, figures unavailable or too small to display.

2 .. denotes disclosive figures.

3 † denotes earliest data revision.

4 Differences may occur between totals and the sum of their independently rounded components.

5 R&D intensity in each product group is estimated by dividing the R&D expenditure of the product group by the turnover of the associated industries, derived from the Annual Business Survey (ABS).

6 Total turnover is a wider measure than product sales as used in the estimates in table 24 (R&D Intensity in manufactured products) so the two measures are not directly comparable.

CONSTRUCTION OF BROAD PRODUCT GROUPS

Broad Product Group	Product Group Code and Title
<p>Manufacturing: Total</p> <p>Chemicals</p> <p>Mechanical engineering</p> <p>Electrical machinery</p> <p>Transport</p> <p>Aerospace</p> <p>Other manufacturing</p>	<p>G. Chemicals and chemical products</p> <p>H. Pharmaceuticals</p> <p>M. Fabricated metal products, except machinery and equipment</p> <p>N. Machinery and equipment</p> <p>O. Office machinery and computers</p> <p>P. Electrical equipment</p> <p>Q. Radio, television and communication equipment</p> <p>S. Motor vehicles and parts</p> <p>T. Other transport equipment</p> <p>U. Shipbuilding</p> <p>V. Aerospace</p> <p>C. Food products and beverages; Tobacco products</p> <p>D. Textiles, clothing and leather products</p> <p>E. Pulp, paper and paper products; Printing; Wood and straw products</p> <p>F. Refined petroleum products and coke oven products</p> <p>I. Rubber and plastic products</p> <p>J. Other non-metallic mineral products</p> <p>K. Casting of iron and steel</p> <p>L. Non-ferrous metals</p> <p>R. Computer, electronic and optical products; photographic equipment</p> <p>W. Other manufactured goods</p>
<p>Other: Total</p> <p>Agriculture, hunting and forestry; Fishing</p> <p>Extractive Industries</p> <p>Electricity, gas and water supply;</p> <p>Waste management</p> <p>Construction</p>	<p>A. Agriculture, hunting and forestry; Fishing</p> <p>B. Extractive Industries</p> <p>X. Sewerage, waste management, remediation activities</p> <p>Y. Electricity, gas and water supply</p> <p>Z. Construction</p>
<p>Services</p>	<p>AA. Wholesale and retail trade</p> <p>AB. Transport and storage, incl. postal and courier activities</p> <p>AC. Telecommunications</p> <p>AD. Miscellaneous business activities; Technical testing and analysis</p> <p>AE. Computer and related activities (excluding software development)</p> <p>AF. Research and development services</p> <p>AG. Public administration</p> <p>AH. Software development</p>